查询FAR-F5CE-820M00-D231供应商

FUJITSU SEMICONDUCTOR
DATA SHEET

DS04-23118-1E

*ASSP Mobile Communication Systems*

# Piezoelectric SAW BPF (700 to 1000 MHz)

# F5CE Series (D2 type)

PRELIMINARY

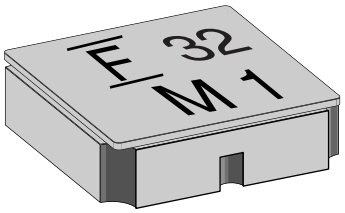
## ■ DESCRIPTION

The F5CE-D2 series of SAW bandpass filters apply to the frequency range 700 to 1000 MHz. These filters make it possible to provide high stopband attenuation and excellent passband flatness due to using unique DMS (Double Mode SAW) technology as design method. Moreover, these filters are provided in small 3.0 mm sq. package. This contributes to reduce weight and size of mobile communication units.
The F5CE-D2 series of SAW filters are suitable for interstage RF filter in mobile communication systems in the frequency range 700 to 1000 MHz. Standard devices are available for AMPS/CDMA/TDMA, GSM, PDC800 and ISM900.

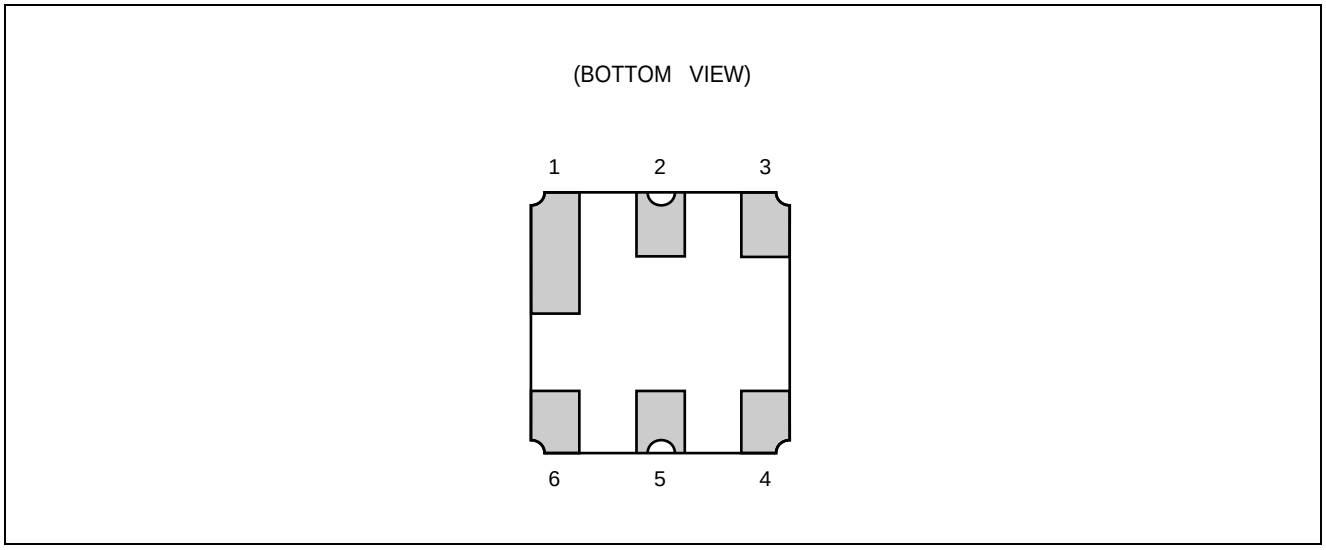
## ■ FEATURES

- Excellent stopband attenuation
- Low insertion loss and low passband ripple
- Ultra compact and light package (3.0 mm sq.)
- External matching circuits are not required. (50 ohms I/O)
- Surface mount package (SMT)
- Standard devices are available for mobile communication standards (AMPS/CDMA/TDMA, GSM, PDC800 and ISM900)

## ■ PACKAGE



## ■ PIN ASSIGNMENT




## ■ PIN DESCRIPTION

| Pin no. | Pin name | Description |
|---|---|---|
| 1 | GND | Ground Pin |
| 2 | IN | Input Pin |
| 3 | GND | Ground Pin |
| 4 | GND | Ground Pin |
| 5 | OUT | Output Pin |
| 6 | GND | Ground Pin |

## ■ ABSOLUTE MAXIMUM RATINGS

| Parameter | Symbol | Rating | | Unit |
|---|---|---|---|---|
| | | Min. | Max. | |
| Operating temperature | Ta | –30 | +85 | °C |
| Storage temperature | Tstg | –40 | +100 | °C |
| Input power | $P_{IN}$ | – | +15 | dBm |
| Input DC voltage | DC | –5 | +5 | V |

WARNING: Piezoelectric devices can be permanently damaged by application of stress (voltage, power, temperature, etc.) in excess of absolute maximum ratings. Do not exceed these ratings.

## ■ RECOMMENDED OPERATING CONDITION

| Parameter | Symbol | Value | | Unit |
|---|---|---|---|---|
| | | Min. | Max. | |
| Operating temperature | Ta | –30 | +85 | °C |

WARNING: Recommended operating conditions are normal operating ranges for the piezoelectric device. All the device's electrical characteristics are warranted when operated within these ranges.

Always use piezoelectric devices within the recommended operating conditions. Operation outside these ranges may adversely affect reliability and could result in device failure.

No warranty is made with respect to uses, operating conditions, or combinations not represented on the data sheet. Users considering application outside the listed conditions are advised to contact their FUJITSU representative beforehand.

## ■ STANDARD FREQUENCIES

| System | | Center freq. (MHz) | B/W (MHz) | Part symbol | Part number | Remarks |
|---|---|---|---|---|---|---|
| PDC800 | Tx | 950.0 | 20 | 30 | FAR-F5CE-950M00-D230 | |
| | Rx | 820.0 | 20 | 31 | FAR-F5CE-820M00-D231 | |
| AMPS /CDMA /TDMA | Tx | 836.5 | 25 | 32 | FAR-F5CE-836M50-D232 | |
| | Rx | 881.5 | 25 | 33 | FAR-F5CE-881M50-D233 | |
| GSM/NMT | Tx | 902.5 | 25 | 34 | FAR-F5CE-902M50-D234 | |
| | Rx | 947.5 | 25 | 35 | FAR-F5CE-947M50-D235 | |
| ISM900 | — | 915.0 | 7 | 38 | FAR-F5CE-915M00-D238 | |

## ■ ELECTRICAL CHARACTERISTICS

### 1. PDC800 (Tx)

**Part number: FAR-F5CE-950M00-D230**

(Ta = –30 to +85°C)

| Parameter | Symbol | Conditions | Value | | | Unit | Remarks |
|---|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | | |
| Insertion loss | IL | 940 to 960 MHz | — | 2.6 | 3.0 | dB | |
| Inband ripple | — | 940 to 960 MHz | — | 0.7 | 1.2 | dB | |
| Absolute attenuation | — | DC to 680 MHz | 50 | 66 | — | dB | |
| | — | 680 to 696 MHz | 50 | 69 | — | dB | |
| | — | 810 to 830 MHz | 50 | 66 | — | dB | |
| | — | 1015 to 1106 MHz | 35 | 42 | — | dB | |
| | — | 1106 to 1700 MHz | 50 | 59 | — | dB | |
| | — | 1700 to 2000 MHz | 40 | 59 | — | dB | |
| Inband VSWR | — | 940 to 960 MHz | — | 1.8 | 2.0 | — | |

### 2. PDC800 (Rx)

**Part number: FAR-F5CE-820M00-D231**

(Ta = –30 to +85°C)

| Parameter | Symbol | Conditions | Value | | | Unit | Remarks |
|---|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | | |
| Insertion loss | IL | 810 to 830 MHz | — | 2.5 | 3.0 | dB | |
| Inband ripple | — | 810 to 830 MHz | — | 0.7 | 1.2 | dB | |
| Absolute attenuation | — | DC to 760 MHz | 50 | 65 | — | dB | |
| | — | 855 to 875 MHz | 28 | 30 | — | dB | |
| | — | 875 to 920 MHz | 35 | 38 | — | dB | |
| | — | 920 to 1200 MHz | 45 | 60 | — | dB | |
| | — | 1200 to 2000 MHz | 40 | 47 | — | dB | |
| Inband VSWR | — | 810 to 830 MHz | — | 1.7 | 2.0 | — | |

### 3. AMPS/CDMA/TDMA (Tx)

**Part number: FAR-F5CE-836M50-D232**

(Ta = –30 to +85°C)

| Parameter | Symbol | Conditions | Value | | | Unit | Remarks |
|---|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | | |
| Insertion loss | IL | 824 to 849 MHz | — | 2.7 | 3.5 | dB | |
| Inband ripple | — | 824 to 849 MHz | — | 0.9 | 1.6 | dB | |
| Absolute attenuation | — | DC to 800 MHz | 50 | 66 | — | dB | |
| | — | 869 to 1049 MHz | 28 | 33 | — | dB | |
| | — | 1049 to 1200 MHz | 50 | 60 | — | dB | |
| | — | 1200 to 2000 MHz | 45 | 50 | — | dB | |
| Inband VSWR | — | 824 to 849 MHz | — | 1.8 | 2.0 | — | |

### 4. AMPS/CDMA/TDMA (Rx)

**Part number: FAR-F5CE-881M50-D233**

(Ta = –30 to +85°C)

| Parameter | Symbol | Conditions | Value | | | Unit | Remarks |
|---|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | | |
| Insertion loss | IL | 869 to 894 MHz | — | 2.7 | 3.5 | dB | |
| Inband ripple | — | 869 to 894 MHz | — | 0.9 | 1.6 | dB | |
| Absolute attenuation | — | DC to 779 MHz | 50 | 63 | — | dB | |
| | — | 779 to 849 MHz | 45 | 50 | — | dB | |
| | — | 914 to 970 MHz | 28 | 33 | — | dB | |
| | — | 970 to 1049 MHz | 50 | 60 | — | dB | |
| | — | 1049 to 2000 MHz | 40 | 50 | — | dB | |
| Inband VSWR | — | 869 to 894 MHz | — | 1.7 | 2.0 | — | |

### 5. GSM/NMT (Tx)

**Part number: FAR-F5CE-902M50-D234**

(Ta = –30 to +85°C)

| Parameter | Symbol | Conditions | Value | | | Unit | Remarks |
|---|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | | |
| Insertion loss | IL | 890 to 915 MHz | — | 2.8 | 3.3 | dB | |
| Inband ripple | — | 890 to 915 MHz | — | 0.8 | 1.4 | dB | |
| Absolute attenuation | — | DC to 845 MHz | 50 | 60 | — | dB | |
| | — | 845 to 870 MHz | 45 | 50 | — | dB | |
| | — | 925 to 935 MHz | 5 | 18 | — | dB | |
| | — | 935 to 980 MHz | 28 | 33 | — | dB | |
| | — | 980 to 1200 MHz | 50 | 60 | — | dB | |
| | — | 1200 to 3000 MHz | 30 | 40 | — | dB | |
| Inband VSWR | — | 890 to 915 MHz | — | 1.7 | 2.1 | — | |

### 6. GSM/NMT (Rx)

**Part number: FAR-F5CE-947M50-D235**

(Ta = –30 to +85°C)

| Parameter | Symbol | Conditions | Value | | | Unit | Remarks |
|---|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | | |
| Insertion loss | IL | 935 to 960 MHz | — | 2.7 | 3.3 | dB | |
| Inband ripple | — | 935 to 960 MHz | — | 0.7 | 1.4 | dB | |
| Absolute attenuation | — | DC to 871 MHz | 50 | 66 | — | dB | |
| | — | 890 to 915 MHz | 30 | 40 | — | dB | |
| | — | 980 to 1025 MHz | 25 | 34 | — | dB | |
| | — | 1025 to 2000 MHz | 45 | 48 | — | dB | |
| | — | 2000 to 3000 MHz | 30 | 33 | — | dB | |
| Inband VSWR | — | 935 to 960 MHz | — | 1.9 | 2.1 | — | |

## 7. ISM900 (7 MHz Bandwidth)

**Part number: FAR-F5CE-915M00-D238**

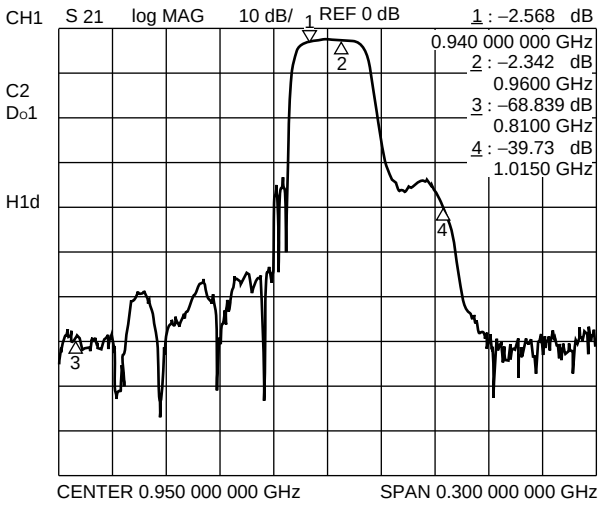
(Ta = –30 to +85°C)

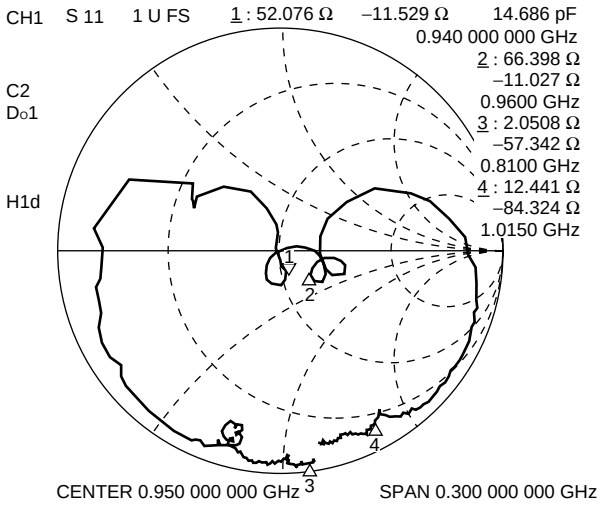
| Parameter | Symbol | Conditions | Value | | | Unit | Remarks |
|---|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | | |
| Insertion loss | IL | 911.5 to 918.5 MHz | — | 3.2 | 3.5 | dB | |
| Inband ripple | — | 911.5 to 918.5 MHz | — | 0.3 | 1.0 | dB | |
| Absolute attenuation | — | DC to 600 MHz | 50 | 66 | — | dB | |
| | — | 600 to 840 MHz | 40 | 35 | — | dB | |
| | — | 869 to 894 MHz | 35 | 40 | — | dB | |
| | — | 970 to 1500 MHz | 40 | 45 | — | dB | |
| | — | 1500 to 3000 MHz | 25 | 28 | — | dB | |
| Inband VSWR | — | 911.5 to 918.5 MHz | — | 1.8 | 2.0 | — | |

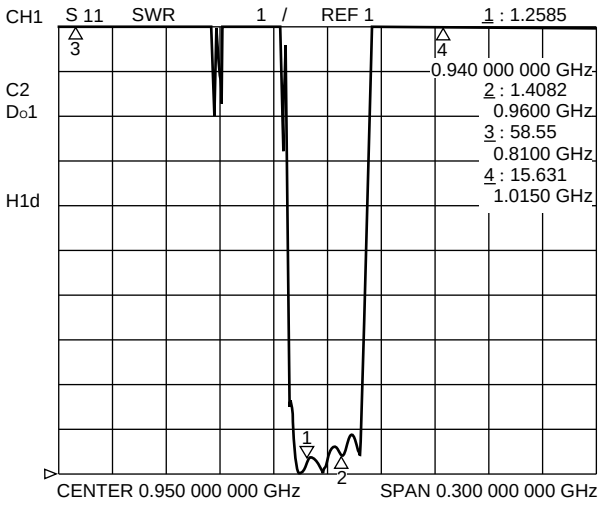
## ■ TYPICAL CHARACTERISTICS (STANDARD VERSION)

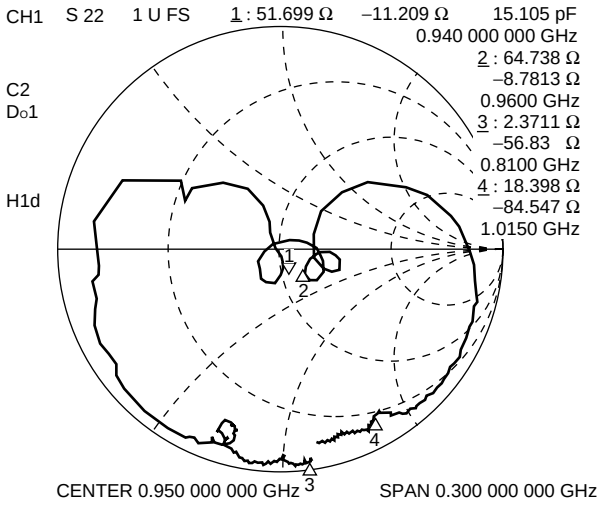
### 1. PDC800 (Tx)

**Part number: FAR-F5CE-950M00-D230**



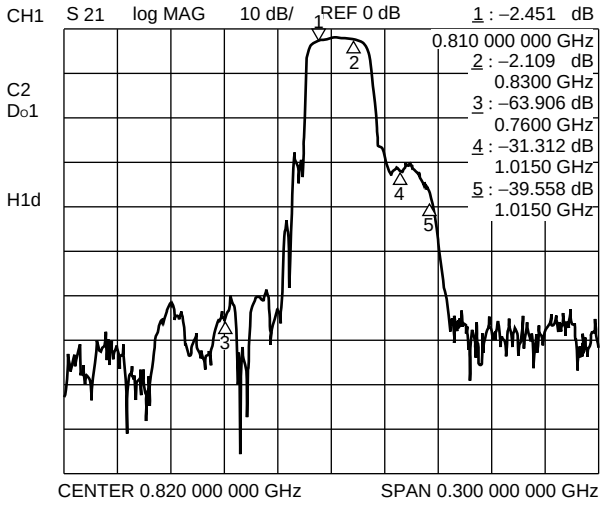



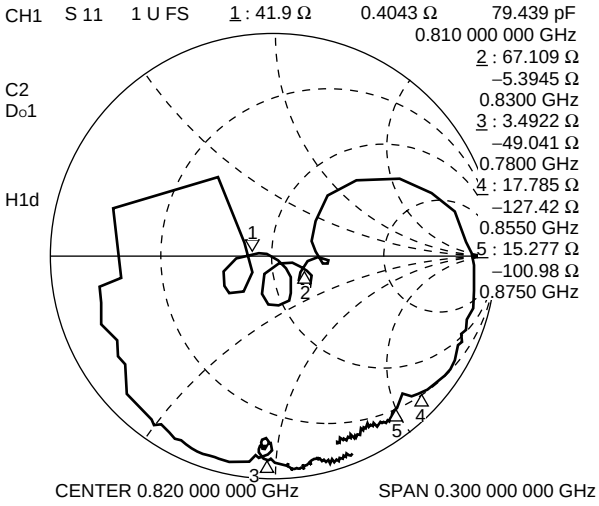



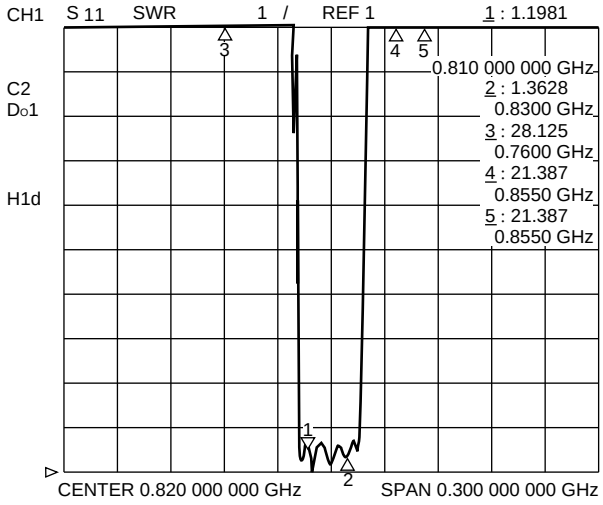



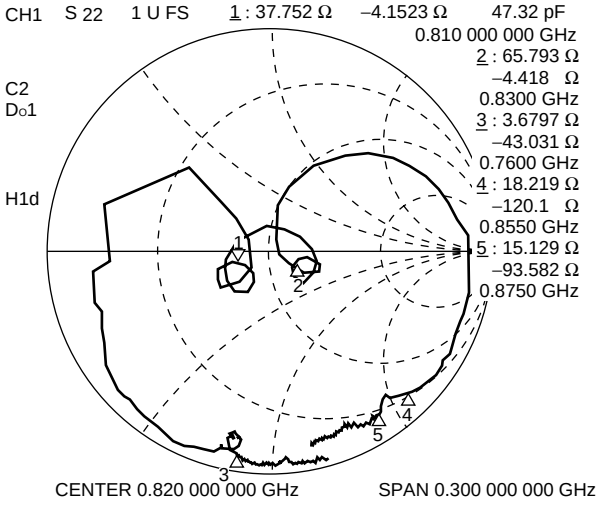
## 2. PDC800 (Rx)

**Part number: FAR-F5CE-820M00-D231**



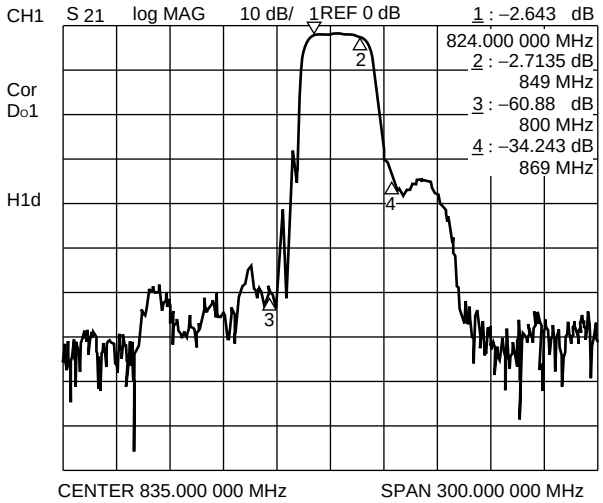



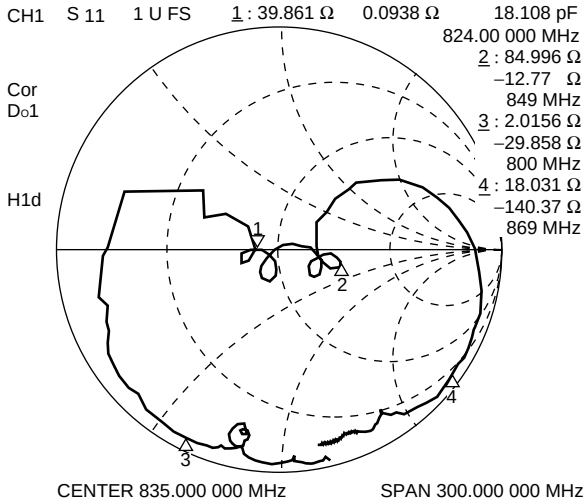



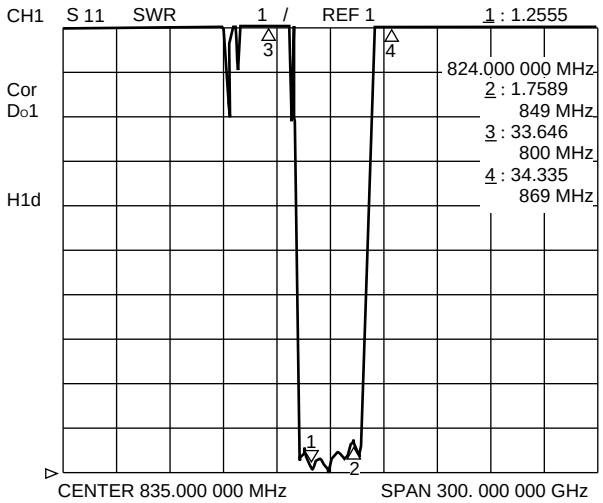



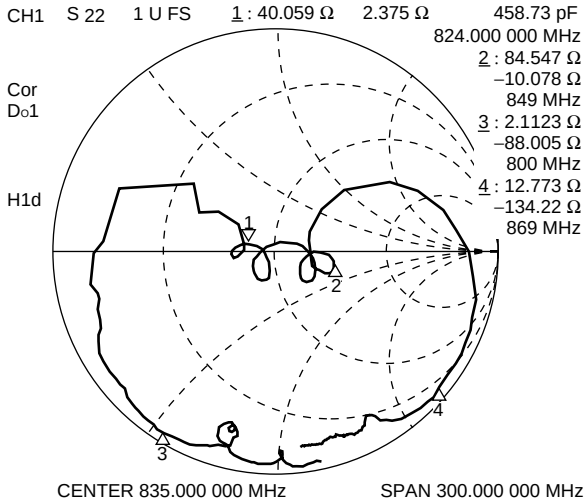
### 3. AMPS/CDMA/TDMA (Tx)

**Part number: FAR-F5CE-836M50-D232**



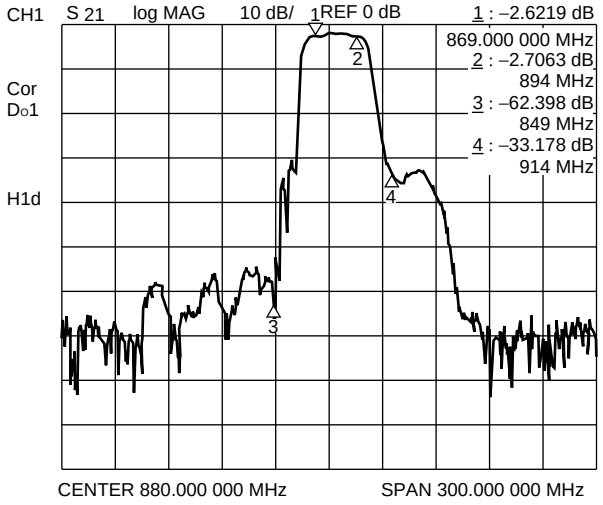



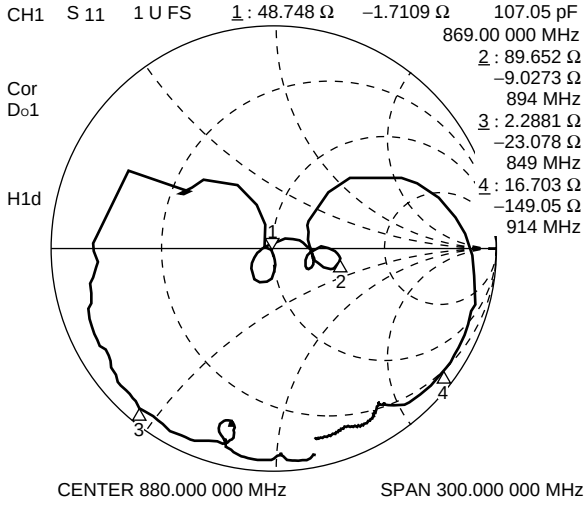



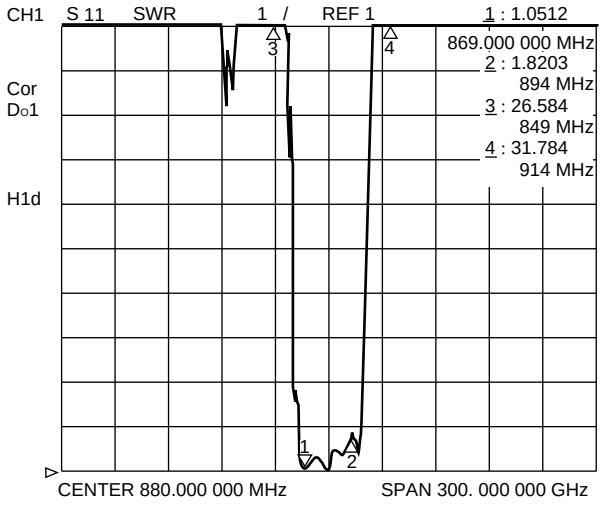



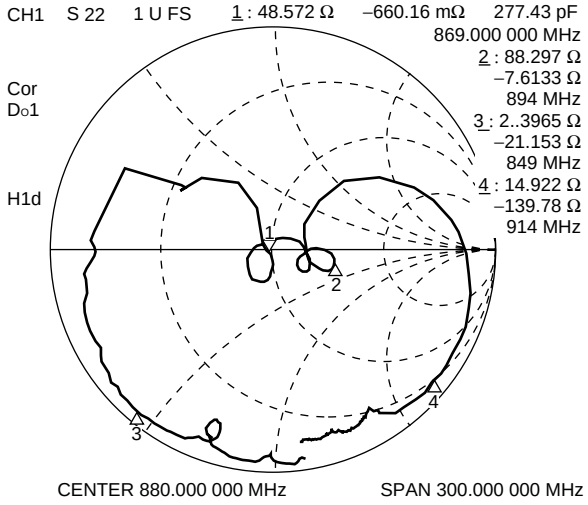
**4. AMPS/CDMA/TDMA (Rx)**

**Part number: FAR-F5CE-881M50-D233**



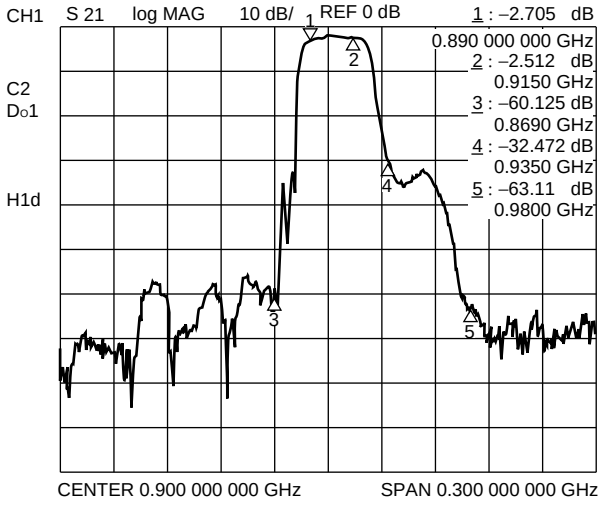



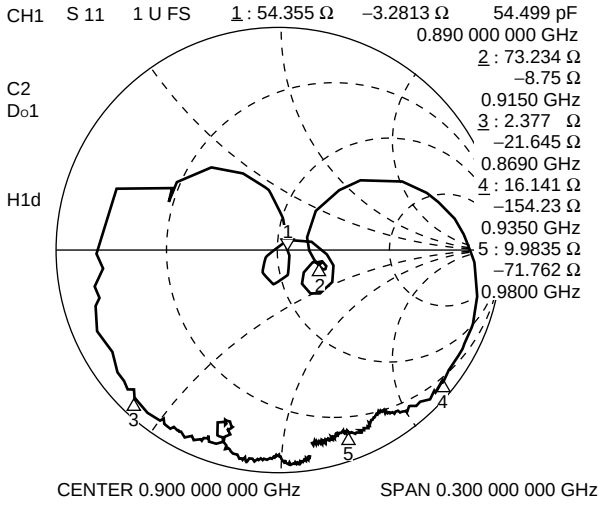



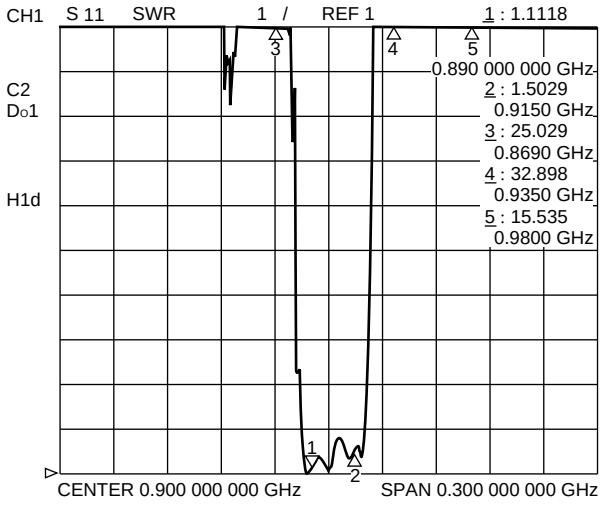



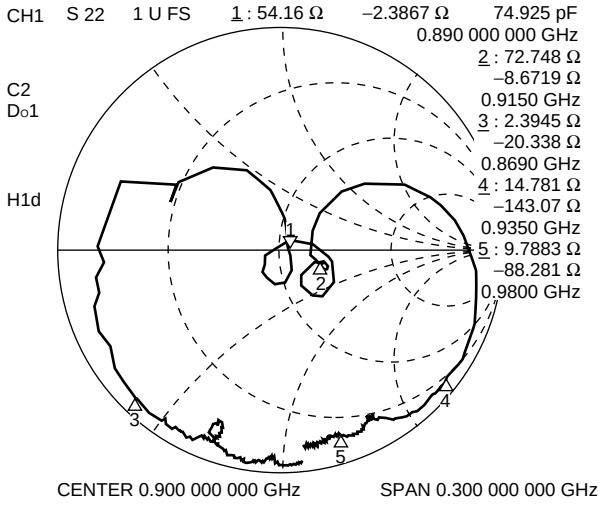
## 5. GSM/NMT (Tx)

**Part number: FAR-F5CE-902M50-D234**



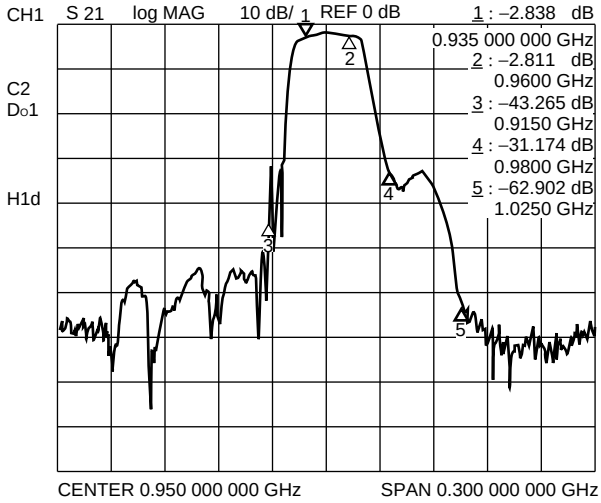



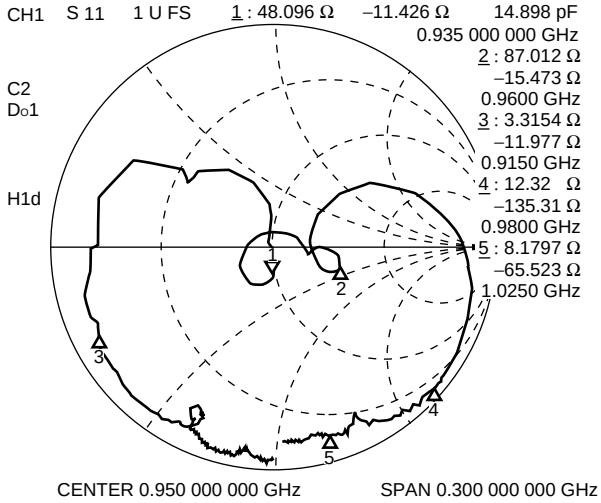



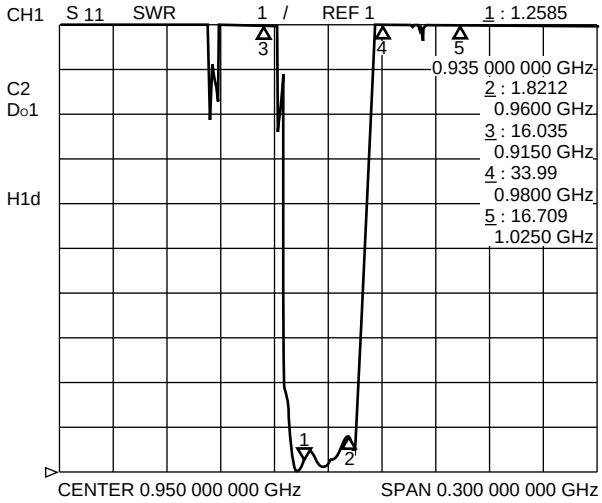



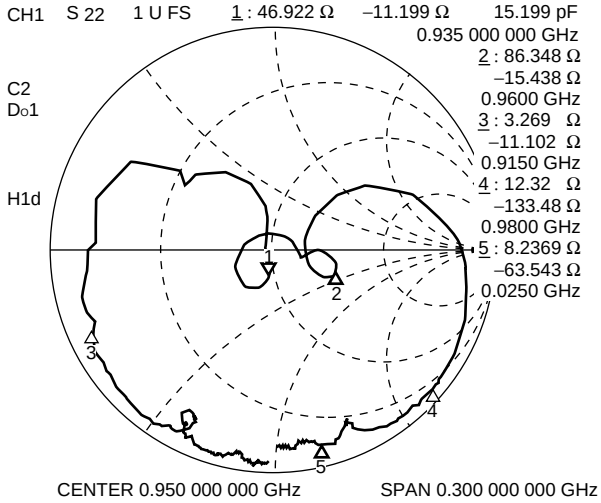
## 6. GSM/NMT (Rx)

**Part number: FAR-F5CE-947M50-D235**



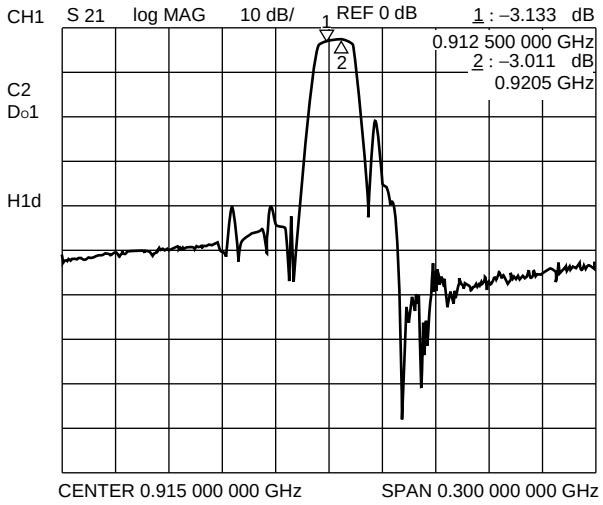



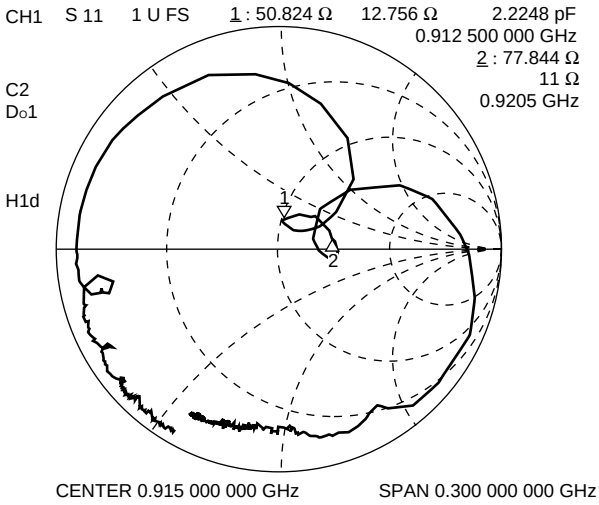



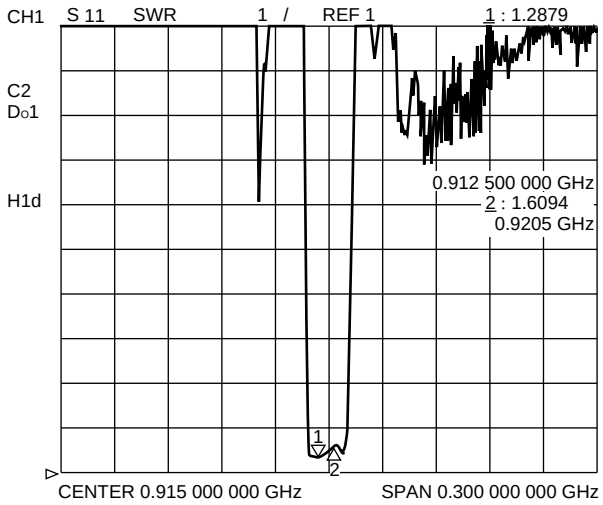



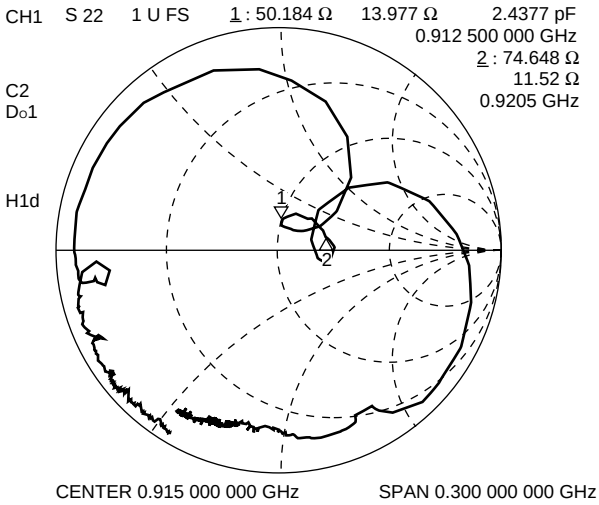
## 7. ISM900 (7 MHz Bandwidth)

**Part number: FAR-F5CE-915M00-D238**

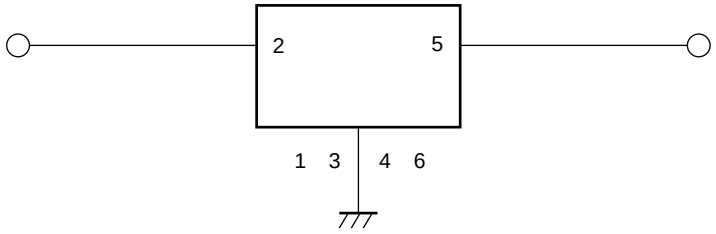


## ■ MEASURING CIRCUIT




1 to 6: Pin numbers

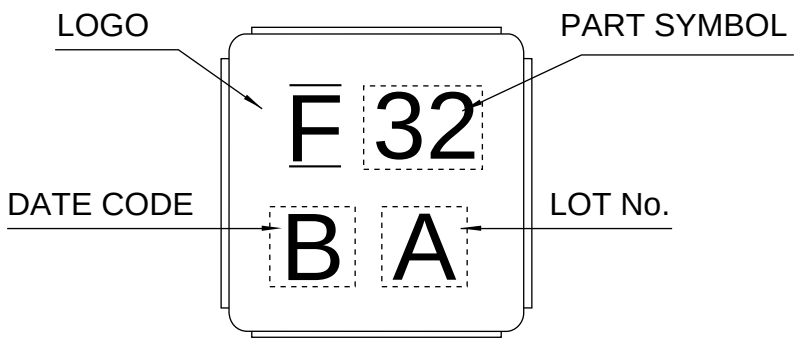
## ■ PART NUMBER DESIGNATION

[Designation example]

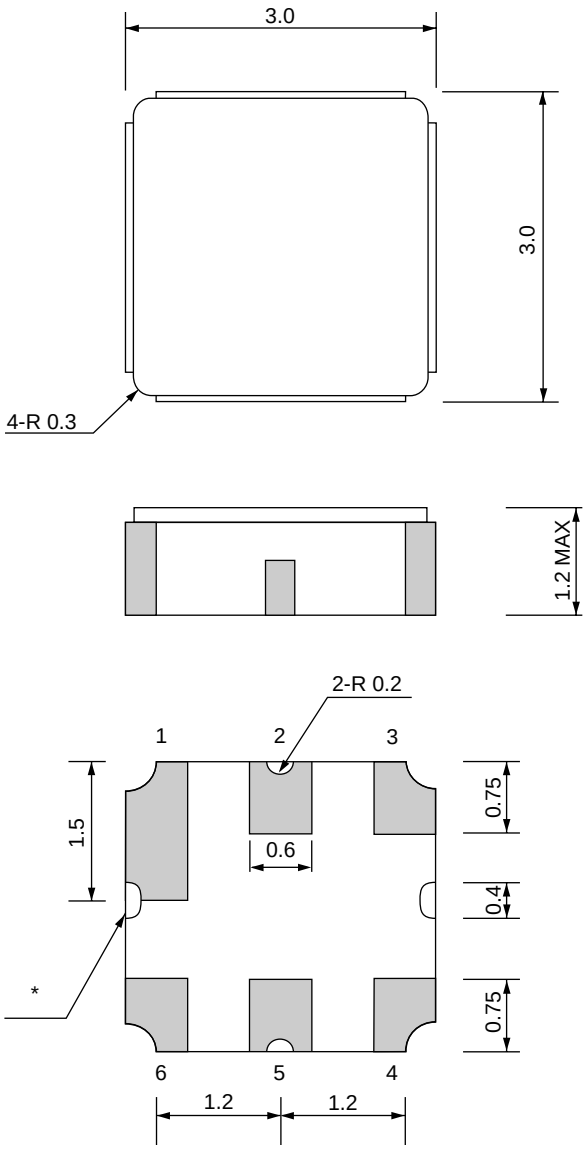
FAR–F5CE–□□□M□□–D2□□–□
(1) (2) (3)

(1) Frequency designation : Specify the nominal frequency in six alphanumeric characters.
Enter M (for MHz) at the decimal point.
Refer to standard frequencies.
[Example] 836.5 MHz ⇒ 836M50
(2) Serial number : Specify a characters from 01 to 99.
Refer to standard frequencies.
(3) Packing (Reeled tape) : W : 1 k pcs/reel
V : 3 k pcs/reel
U : 5 k pcs/reel

## ■ MARKING



## ■ PACKAGE DIMENSION

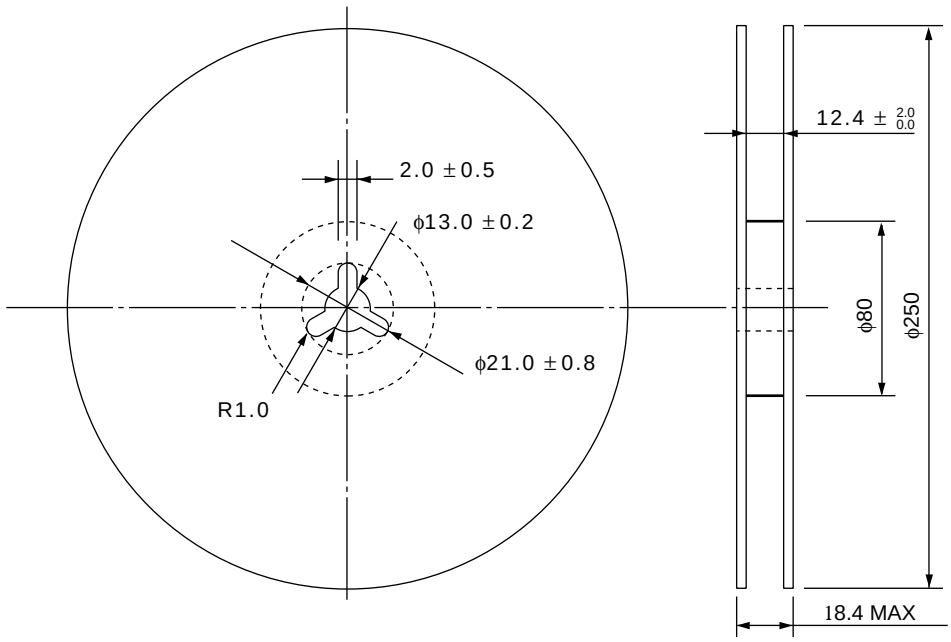



Dimensions in mm

* : Two types of package are available.
One of them may be supplied without these cut outs.

## ■ PACKING: Reel type

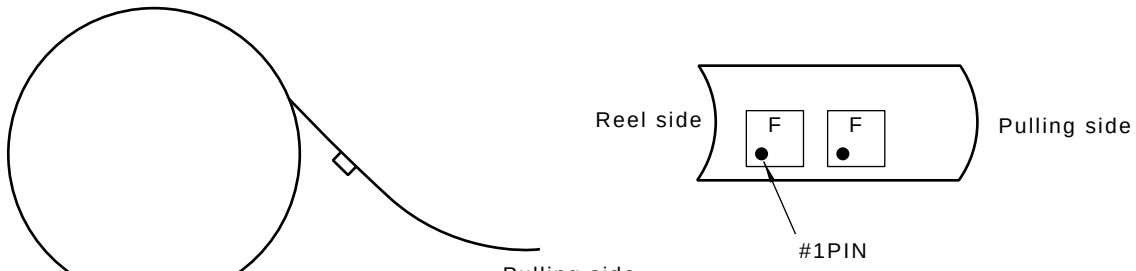
### 1. Reel Dimensions



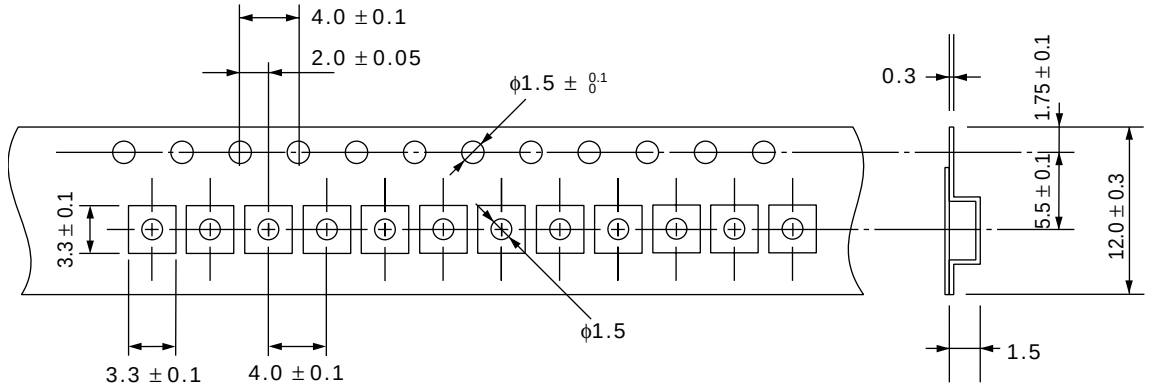

| Type | Volume |
|---|---|
| W | 1 k pcs |
| V | 3 k pcs |
| U | 5 k pcs |

Dimensions in mm

### 2. Packing Style



### 3. Tape Dimensions




Dimensions in mm

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